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INFORMATION ABOUT BEE CULTURE[1/]

Issued by the Field Crops Insects and Bee Culture Research Branch,
Entomology Research Division

This publication contains general information of particular interest to small beekeepers and to persons who are considering going into beekeeping. In addition to giving advice to beginners, it includes lists of publications on bees, the name and addresses of commercial companies who serve the beekeeping industry, beekeeping organizations, and the bee culture activities of the U. S. Department of Agriculture.

If you have questions that are not covered in this publication, send your inquiries to the Bee Culture Section, Agricultural Research Center, Beltsville, Md. For local information write to the bee inspector of your State department of agriculture or your extension bee specialist at the State agricultural college.

The honey bee is our only source of honey and beeswax. It produces more than 230 million pounds of honey and about 4 million pounds of beeswax annually in the United States. However, these are merely by-products of the honey bee. Its principal role is in the pollination of over 50 agricultural crops for the production of seed and fruit. Many other insects, mostly native bees, are of value as pollinators, but their numbers have been so depleted in the course of agricultural development that they can no longer be relied upon for most crops. Honey bees are now the most important flower-visiting insects in practically all agricultural areas. Transfer of pollen from flower to flower is so essential to seed and fruit production that beekeeping must be carried on to maintain a profitable agriculture.

1/ This is a revision of ARS-33-10, Information about Beekeeping, issued in 1955.

Honey bees are kept by many persons as a hobby or as a side line to some other occupation. Apiculture, which is the keeping of bees and a study of their life and habits, is a fascinating avocation for people in all walks of life and of all ages. In fact, of the 425,000 persons who keep bees in this country, only a small percentage are full-time commercial beekeepers. The latest figure of the Department of Agriculture places the total number of colonies in the United States at 5,332,000.

Keeping bees on a commercial scale, usually in excess of 400-500 colonies, requires that they be located in areas with an abundance of honey plants. Experience in handling bees is another prime requirement. However, a few colonies to furnish honey for the home table or to effect pollination can be kept almost anywhere. A beekeepers' organization has existed for years in the heart of New York City. If there is no close source of food, honey bees will fly several miles to find honey plants. It is not feasible to establish or cultivate plants for bee forage alone, for there is no way to guarantee that your bees will have exclusive use of whatever you might plant.

Advice to Beginners

To be successful in beekeeping you should have a fundamental knowledge of bee behavior and a genuine liking for handling bees. To insure good honey crops the bees should be within flying range--that is, within 1 or 2 miles--of an abundance of nectar-secreting plants. Good beekeeping locations can be found in practically every State, so that the selection of apiary sites is merely a matter of finding where such plants occur in profusion.

With proper experience and a liking for bees, a person in a favorable location can obtain from beekeeping a return that compares favorably with that from most agricultural pursuits. However, beekeeping can easily become a profitless undertaking, and to avoid this beginners should not invest heavily. Much practical knowledge can be gained through a season's work with an experienced beekeeper. If you cannot spend time with a beekeeper, simply acquire two or three colonies and do the best you can. A number of State educational institutions offer resident or correspondence courses in beekeeping.

A common method of starting a colony is to purchase a package of bees, preferably 3 pounds, with a queen and to install this package in a hive equipped with frames containing full sheets of brood foundation. Instructions for installing usually accompany the package. If you purchase established colonies, obtain them from a reliable beekeeper and be sure they are in modern hives and accompanied by a certificate of inspection to insure freedom from disease. The best time to begin beekeeping with either package bees or established colonies is in the spring, when fruit trees and dandelions are in bloom.

A beginner's equipment may consist of the following items, although it is suggested that catalogs from some of the bee-supply houses be consulted for comparable information:

1 10-frame hive, consisting of--
  1 bottom board
  2 10-frame hive bodies complete with frame and brood foundation
  2 to 4 shallow supers complete with frames and thin super foundation
1 3-pound package of bees with queen
1 smoker
1 bee veil
1 hive tool
10 to 15 pounds of granulated sugar
4 ounces of No. 28-gage wire
1 spur imbedder

Such equipment, plus a subscription to a bee journal, costs approximately $25 to $35. After a person has become experienced and learns how to manage large colonies, the equipment can be varied and more can be added. The standard 10-frame hive is the type generally used in the United States.

With this equipment it is not necessary to purchase a honey extractor, uncapping knife, or honey tanks. The honey produced in the shallow frames can be cut into four equal pieces and placed in individual leakproof plastic bags. After a season or two you may wish to produce honey in the small wooden sections. To do this, however, requires more skill in handling the colony. To produce honey in the liquid form for bottling, you will need an extractor and other items of equipment.

Although factory-made equipment is ordinarily the most satisfactory, some beekeepers prefer to construct their own hives. If you do this, it is a good plan to purchase or borrow a complete hive to use as a model. Be sure to reproduce all dimensions exactly; otherwise the bees will build combs and add propolis where it is not desired. Careful construction is necessary so that all hive parts are readily interchangeable.

The Italian bee is the kind recommended for the beginner in this country. It is hardy, industrious, and fairly gentle, and can be readily obtained in pure stock since it is the bee most commonly kept in the United States.

Cardinal Points in Beekeeping

1. Bees need an abundant store of honey (25 or more pounds during the active season and 50 to 60 pounds in winter), pollen, plenty of room for brood rearing, a source of water, protection from the wind, and exposure to sunlight.

2. There should be empty comb space in hives before and during a honey flow. When every cell becomes occupied with brood, pollen, or honey, the bees will swarm or stop working, in either case causing a loss of honey if just before or during a flow. It is especially important to give them plenty of comb storage space to discourage swarming.

3. Starvation is one of the principal causes of unprofitable beekeeping. If bees are short of honey stores, feed them a sirup of 2 parts of clean granulated sugar to 1 part of water. By carefully planning you can avoid having to feed the bees by leaving them with plenty of their own honey at all times.

4. For successful wintering a colony should have a young queen of high-producing stock, a large cluster of young fall-raised bees, up to 60 pounds of sealed honey, and several combs containing large areas of pollen. For these requirements a colony must have a 2-story standard hive with a gross weight, in October, of about 130 pounds.

5. It is unprofitable, and in many States illegal, to keep bees in box hives or "gums."

6. It does not pay to cultivate any plant for bees alone. Nectar resources may be improved, however, by planting such crops as sweet-clover on waste lands.

Insecticides and Bees

Field and orchard crops are important sources of pollen and nectar for bees and, since such crops are often treated with insecticides, beekeepers frequently face a bee-poisoning problem. However, it is only when large areas are treated that bees are seriously affected. The occasional spraying of isolated plants or gardens may kill a few bees, but the overall effect on colonies is negligible. Complete loss of the field force following a single flight focuses attention on the problem, but less noticeable, recurring losses may leave the colonies in a more precarious condition at the end of the season. Fortunately, there seems to be little danger of contaminated honey getting into their surplus stores.

How can the beekeeper minimize losses from insecticides? He can be forewarned of areas where their large-scale use year after year makes beekeeping difficult. However, such areas may have excellent potentials for honey production. Unfortunately the beekeeper is usually

not in a position to "call the shots." The best hope lies in the growers' realization of the value of bees as pollinators. They may then exercise greater care in selecting insecticides and applying them under conditions that will safeguard the bees as much as possible.

If a beekeeper keeps posted as to the time and character of the insecticides to be applied in the vicinity of his colonies, he can judge the hazard and, if necessary, move his colonies to a temporary location out of flight range of the insecticides. If he has an opportunity to work with the farmers of his area to develop a program that safeguards bees, he should stress the following general rules: (1) Insecticides should not be applied to open blossoms. (2) The safest time to apply insecticides is in the late afternoon after the bees have stopped flying; early morning applications are less dangerous than those in the middle of the day, but more so than those made in late afternoon, especially of such materials as parathion and malathion which lose much of their toxicity overnight. (3) For a given insecticide, sprays are less harmful than dusts.

Diseases and Pests of Bees

Honey bees, like most living creatures, are subject to certain diseases and pests. Some of the diseases are contagious, and care is required to lessen their spread and minimize their harm. Consequently, a beekeeper should familiarize himself with the characteristics of healthy, normal colonies in order to recognize, or at least to suspect, signs of disease. Freedom from disease should be required in purchasing bees and used beekeeping equipment.

American foulbrood and European foulbrood are the most serious brood diseases. Nosema disease is the most serious ailment of adult bees. Effective methods of control are known for these and most other diseases of bees.

Honey is a carrier of American foulbrood. Consequently, only disease-free honey should be fed to bees; sugar sirup is safer if they have to be fed. Bee-disease germs in honey are harmless to humans.

The wax moth is a universal pest of weak colonies, but particularly in areas with mild winters. The larvae of this moth will destroy unprotected combs, such as those in weak colonies or in storage.

If colonies are headed by good queens, have large enough populations and plenty of food at all times, and are kept in good clean hives, diseases and pests should not cause much worry.

How to Send Samples for Diagnosis

Most State departments of agriculture maintain apiary inspection services, which make diagnoses of bee diseases and give information on methods of controlling them.

The U. S. Department of Agriculture also examines samples of brood and adult bees. Reports of these diagnoses are sent to the beekeepers, and copies go to the proper State apiary officials. Such samples should be sent to the Bee Culture Section, Agricultural Research Center, Beltsville, Md. For diagnosis of brood diseases, send a sample of comb about 4 inches square containing the affected brood or brood remains; no honey should be present and the comb should not be crushed. For diagnosis of adult diseases or insecticide poisoning, send about 200 sick or dead bees. Mail all samples in a wooden or strong cardboard box. Do not use tin, glass, plastic, aluminum foil, or waxed paper, as these materials promote growth of mold which increase the difficulty of making a satisfactory diagnosis. Write your name and address on the box. If the sample is forwarded by an inspector, his name and address should also appear on the box or in an accompanying letter.

Publications on Bee Culture

The world's literature on apiculture is very extensive. Thousands of books, both scientific and popular, have been published in all languages. Journals devoted to various phases of beekeeping are published regularly in all countries in which beekeeping is important.

Bee Journals

The following are issued monthly:

American Bee Journal, Hamilton, Ill.
Gleanings in Bee Culture, Medina, Ohio

A number of State beekeepers' associations furnish monthly news notes to their members.

Books

The following books cover almost all phases of practical and theoretical bee culture as well as the romance of beekeeping. Some of these books may be in your public library and also available from book dealers.

ABC and XYZ of Bee Culture. A. I. and E. R. Root. 1954.
American Honey Plants. Frank C. Pellett. 1947.
Anatomy of the Honey Bee. R. E. Snodgrass. 1956.
Beekeeping as a Hobby. Kyle Onstott. 1941.
Bee Venom Therapy. Bodog F. Beck. 1935.
Bees: Their Vision, Chemical Senses, and Language. K. von Frisch. 1950.

Beeswax. H. H. Root. 1951.
Behavior and Social Life of Honeybees. C. R. Ribbands. 1953.
Dancing Bees. K. von Frisch. 1954.
500 Answers to Bee Questions. Walter Barth. 1955.
Hive and the Honey Bee. Roy A. Grout. 1949.
Honey and Your Health. B. Beck and D. Smedley. 1944.
Honey in the Comb. Carl E. Killion. 1951.
Honey Plants of North America. J. H. Lovell. 1926.
Life of the Bee. M. Maeterlinck. 1904.
Makers of Honey. Mary Phillips. 1956.
Practical Queen Rearing. Frank C. Pellett. 1946.
Queen Rearing. H. Laidlaw and J. Eckert. 1950.
World of the Honey Bee. Colin G. Butler. 1954.

Bee Culture Research Laboratories in the Department of Agriculture

In the Department of Agriculture the work on bee culture and insect pollination is conducted in the Field Crops Insects and Bee Culture Research Branch of the Entomology Research Division. Headquarters for the Bee Culture Section of this Branch are at the Agricultural Research Center, Beltsville, Md. Most of the research is conducted at laboratories in various parts of the country, in cooperation with the State agricultural experiment station or university. Their addresses are as follows:

Arizona--Bee Culture Laboratory, College of Agriculture, University of Arizona, Tucson
Louisiana--Bee Culture Laboratory, Agricultural Center, Louisiana State University, Baton Rouge.
Utah--Legume Seed Research Laboratory, Campus Box 80, Utah State University, Logan
Wisconsin--Bee Culture Laboratory, 209 King Hall, University of Wisconsin, Madison
Wyoming--Bee Culture Laboratory, University of Wyoming, Laramie

Information on Honey and Beeswax Issued in the Department of Agriculture

Other types of assistance rendered by various agencies in the Department are indicated below.

Semimonthly Market News Reports.--Selling prices and quotations on honey, with reference to various containers, grades, and floral sources, and sales records or offered prices on beeswax, as received from beekeepers, wholesale and retail sellers, in important producing areas, together with comments on the condition of bees and honey plants, and the honey market. Similar information and also honey arrivals and market conditions in 15 large marketing centers. Honey and beeswax import and export statistics are shown by countries of origin or destination.

United States Standards for Grades of Comb Honey (effective August 1933) and of Extracted Honey (effective April 16, 1951).--Reprinted without change in April 1957 following a two-year review by members of the honey industry and the Department of Agriculture.

Both the market news reports and the grade standards are obtainable from the Fruit and Vegetable Division, Agricultural Marketing Service, Washington 25, D. C.

Production and Price Statistics.--Three times a year the Crops Reporting Board, Agricultural Marketing Service, Washington 25, D. C., issues estimates by States, as follows: In January, the yield per colony and total production of honey and beeswax for the preceding six years; stocks on hand for sale as of the preceding December 15, and prices of honey, by different types of sale, for the preceding two years. Late in July, the current season's colony count and condition of bees and nectar-producing plants as of July 1, and percentages of colonies lost during the previous winter and spring. In October, preliminary estimates of honey production for the current year, and stocks for sale as of September 15.

Price-Support Program.--The Agricultural Act of 1949, as amended, makes honey price support for beekeepers meeting certain requirements mandatory at annually decided levels, ranging between 60 and 90 percent of parity. The program

provides for the support of most flavors of that season's crop, when packed in containers ranging in capacity between 5 and 70 gallons, and when equal to or better than U. S. grade C. This support, averaging 9.7 cents per pound, is handled through approved farm-storage loans or purchase agreements. For detailed information contact the Commodity Stabilization Service, Washington 25, D. C.

Research on Honey.--Information obtainable from Eastern Utilization Research and Development Division, Philadelphia 18, Pa. "Permanent Glass Color Standards for Extracted Honey," AIC-307, issued in 1951, is available from that office.

Bee Supply Houses

The following companies handle a complete line of supplies and equipment for beekeepers, including hives, honey-house equipment, containers, bees, and queens. Most of these companies will send catalogs on request.

C. W. Aeppler Co., Oconomowoc, Wis.
Dadant and Sons, Hamilton, Ill.
Diamond Match Co., Chico, Calif.
Hubbard Apiaries, Onsted, Mich.
Walter T. Kelley, Clarkson, Ky.
Leahy Manufacturing Co., Higginsville, Mo.
August Lotz Co., Boyd, Wis.
Marshfield Mfg. Co., Inc., Marshfield, Wis.
A. I. Root Co., Medina, Ohio
Superior Honey Co., Los Angeles, Calif., and Ogden, Utah
Williams Brothers Mfg. Co., Portland, Oreg.
A. C. Woodman Co., Grand Rapids, Mich.

Organizations in the Beekeeping Industry

American Bee Breeders Association--Garnett Puett, Jr., secretary, Hahira, Ga.

American Beekeeping Federation--Robert Banker, executive secretary and treasurer, Cannon Falls, Minn. A national organization of State and county beekeepers' organizations and individual beekeepers.

American Honey Institute--Mrs. Harriett M. Grace, director, Commercial State Bank Building, Madison, Wis. An organization supported by bee-supply companies, beekeepers' organizations, and individuals. Its purpose is to give publicity to honey through demonstrations, lectures, radio talks, honey recipes, and other literature.

Apiary Inspectors of America--Lloyd N. Graham, sectretary, Montana State College, Bozeman.

Bee Industries Association--John Root, secretary, A. I. Root Co., Medina, Ohio. Representing supply manufacturers.

Eastern Apicultural Society--Maxine V. Manchester, Middlebury, Vt. A society devoted to the cultural, scientific, and practical aspects of bee culture. Membership is open to all persons in the Eastern States interested in honey bees.

Honey Bee Improvement Cooperative Association --Charles A. Reese, secretary, Ohio State University, Columbus, Ohio. A nonprofit organization to promote the distribution of improved strains of the honey bee.

Honey Industry Council of America--Leslie Little, secretary, Shelbyville, Tenn. An organization of representatives of the American Beekeeping Federation, Bee Industries Association, American Bee Breeders' Association, and the National Honey Packers and Dealers Association.

National Honey Packers and Dealers Association--Ken Bradshaw, secretary, Wendell, Idaho.

Southern States Beekeepers' Federation--W. A. Stephen, secretary, State College Station, Raleigh, N. C. An organization of honey producers, shippers of package bees, and queen breeders devoted to the interest of beekeeping in the Southern States.

State Beekeepers' Organizations--A beekeepers' organization exists in practically every State. Information about them can usually be obtained through your State department of agriculture or your agricultural college or experiment station.